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# How Health Media Environment and Communication Orientations Affect Health Outcomes: An Application of $O_1$-S-$O_2$-R Model

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Extant studies tend to simply connect mass media use and health outcomes, closing off a number of avenues to theorizing interpersonal communication as a potential intervening process of health media effects. To directly address this issue, we explicate the mechanism of how health media attention influences health outcomes through its effects on two interpersonal communication orientations, conventional patient-centered communication and online interactive health messaging. We explore these relationships using data collected from the Health Information National Trends Survey conducted with a nationally representative sample of U.S. residents. Overall,

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these results shed some light on (a) the relationship between health media attention and online health messaging, and (b) how two interpersonal communication orientations are linked to health-related outcomes in a new health communication ecology.

*Key words : Health media attention, $O_1$-S-$O_2$-R Model, patient-centered communication, online health messaging.*

## 1. Introduction

Health communication research has documented that health media consumption plays an important role in promoting health-related attitudes, beliefs, and social norms (Rains & Ruppel, 2016; Ruppel, 2016; Southwell & Yzer, 2007). Various forms of media, both traditional and new, offer valuable resources and opportunities for raising awareness about new information and promoting healthy behaviors. Nonetheless, these effects are generally tempered in a crowded media environment where conflicting viewpoints, false information, or fake news are often disseminated through the same media outlets. In this regard, the importance of understanding interpersonal communication to comprehend media effects has been suggested from early communication research (e.g., Katz, 1987; Katz & Lazarsfeld, 1955). These studies acknowledge the possibility that media exposure can stimulate interpersonal discussion about a specific health issue, which in turn can influence health behavior among audiences.

This study examines the process through which the general public attends and responds to health messages in a new health communication

ecology. Emphasizing the need for evaluation of interpersonal communication in health communication research, Southwell and Yzer (2007) noted earlier that extant studies tend to simply connect mass media use and health outcomes, such as knowledge, beliefs, and attitudes, and close off a number of avenues to theorizing interpersonal communication as a potential outcome of media effects that could be also linked to health outcomes. Unfortunately, their critique remains true in the field of health communication after more than a decade. To directly address this issue, we explicated how health media use can potentially be linked to health outcomes through its effects on interpersonal communication orientations of patient-centered communication (Baker & Watson, 2015; Hou & Shim, 2010; Wanzer, Booth-Butterfield, & Gruber, 2004) and online interactive health messaging (Han et al., 2014; Han et al., 2011; Himelboim & Han, 2014; Shim, Cappella, & Han, 2011). We explored these relationships using data collected from the Health Information National Trends Survey (HINTS 4, Cycle 1) conducted with a nationally representative sample of the United States.

## 2. Literature Review

### 1) Media Effects on Health Outcomes: Orientation$_1$-Stimulus-Orientation$_2$-Response Model

In this study, we explored the process through which audiences attend and respond to health messages on various media platforms. Toward this end, we adopt the Orientation$_1$-Stimulus-Orientation$_2$-Response ($O_1$-S-$O_2$-R)

model (Markus & Zajonc, 1985), which challenges traditional stimulus-response (S-R) perspectives and acknowledges the important role of intervening factors. The $O_1$-S-$O_2$-R model provides an effective lens through which to explore the associations among structural socio-demographic factors, individual predisposition, messages obtained from media, and resultant attitudinal and behavioral components of the human reaction. In this model, the pre-orientation factor ($O_1$) represents "the set of structural, cultural, cognitive, and motivational characteristics the audience brings to the reception situation that affects the impact of the messages (S)" (McLeod, Kosicki, & McLeod, 1994, p. 146). The post-orientation variable ($O_2$) indicates "what is likely to happen between the reception of the message and the subsequent response (R) or outcome"(McLeod et al., 1994, p. 146-147).

McLeod et al. (2001) incorporated the $O_1$-S-$O_2$-R framework into the communication mediation model. McLeod and his colleagues suggested that the effects of mass media (S) on participatory behaviors (R) can either be direct or indirect via potential intervening factors ($O_2$) while considering the pre-orientation factors ($O_1$) as control variables. In the model, McLeod and his colleagues identified several possible intervening factors ($O_2$), interpersonal discussion, information processing, supportive attitudes, knowledge, and cognitive complexity function, which function as linking mass media effects and outcome behaviors (McLeod et al., 2002).

The value of the $O_1$-S-$O_2$-R framework has initially garnered considerable attention in political communication research (e.g., Cho et al., 2009; Shah et al., 2007). Given that engaging in health behaviors is a result of a decision-making process in common with political participation (e.g., theory of planned behavior; Ajzen, 1985, 1991), the application of the framework

to health communication is relevant. Indeed, few studies have begun to take the $O_1$-S-$O_2$-R perspective to grasp health communication dynamics in a more integrative way. For instance, Paek (2008) took the model to explore the effectiveness of anti-smoking campaigns, treating anti-smoking education and sensation-seeking as $O_1$ variables, exposure to an antismoking campaign and pro-smoking media messages as S variables, negative attitude toward tobacco companies and peer smoking norms as $O_2$ variables, and smoking intention as an R variable. In addition, Yoo's study (2013) revealed that individuals with more concern about their weight ($O_1$) watched more of the weight-loss reality show, *The Biggest Loser* (S), and that consumption of *The Biggest Loser* positively affected perceived locus of weight control ($O_2$). Subsequently, perceived locus of weight control positively predicted negative attitudes and beliefs toward obese persons (R).

Despite these applications of the $O_1$-S-$O_2$-R model, the health communication discipline lacks empirical research testing the role of interpersonal communication ($O_2$) in linking between mass media uses (S) and outcomes related to health behaviors (R) while taking pre-existing factors of audiences ($O_1$) into consideration. Whether planned or not, attention to media can stimulate interpersonal talks, and the importance of understanding interpersonal communication to comprehend media effects has been suggested from early communication research (e.g., Katz, 1987; Katz & Lazarsfeld, 1955). With regard to this argument, previous research acknowledged that interpersonal conversation prompted by mass media use can influence behavior among audiences. For example, Shah et al. (2007) documented that the use of media encourages interpersonal political discussion, which in turn, fosters political participation. Southwell and Yzer (2007) also recognized interpersonal communication as a potential

intervening factor of media effects and emphasized the need for the evaluation of interpersonal communication.

### 2) Patient-Centered Communication

This study examines two specific types of interpersonal communication, patient-centered communication and online health messaging, and their impact on health outcomes. Among different aspects of patient-centered communication that affect its effectiveness, previous studies consistently emphasize the importance of patient's perception of the degree to which communication between providers and patient is patient-oriented or cooperative (Baker & Watson, 2015; Hou & Shim, 2010; Wanzer et al., 2004). The patient-centered communication is a multidimensional concept, referring to the provider's response to patient's emotions, shared decision-making, and exchange of information (Cegala, McGee, & McNeilis, 1996; Wanzer et al., 2004). In this regard, patient-centeredness of provider-patient communication has been endorsed as a central component engendering clinical outcomes, such as patient satisfaction, adherence to treatments, and medical outcomes (Brown, Steward, & Ryan, 2003). In their conceptual piece, for instance, Street and his colleagues (2009) proposed that patient-centered communication could indirectly contribute to health outcomes via increases in understanding, trust, a feeling of knowing/involvement, and motivation. This perspective resonates with the findings of previous studies suggesting that the concept of patient-centered communication involves addressing psychological needs and lowering the uncertainty of patients (Oates, Weston, & Jordan, 2000; Wanzer et al., 2004). In this sense, patient-centered communication can be conceived as

a subjective assessment that could promote psychological states of readiness to actively engage in general health-related outcomes, including more confidence in one's own healthcare and keeping up with the annual preventive visit.

### 3) Online Health Messaging

Due to the low cost and easiness of participating in social interaction through various online platforms, the public is increasingly turning to e-health technology for health-related resources and information. Online technologies, such as email, social media, blogs, and support groups, can offer viable spaces for sharing knowledge and experience, as well as providing and seeking social support when facing illness and health problems (Høybye, Johansen & Tjornhoj-Thomsen, 2005). Scholars have found that engaging in interactive online health messaging can enable people to expand their control over their own health problems, and manage uncertainty about their situations, leading to physical and psychological benefits (Kim et al., 2012; Rice & Katz, 2000; Street, Gold, & Manning, 1997).

There are two reasons behind the salutary effects of online health messaging. First, it allows people to express their concerns and emotions, which can have a range of psychosocial benefits by alleviating the negative effects of stressful life events and experiences (Lieberman & Goldstein, 2006). Past studies on health benefits of expression have found that using one's own language and experience to help and support others can lead to increased feelings of competence, strength, and independence (Roberts, Salem, Rappaport, Toro, Luke, & Seidman, 1999). Second, online health

messaging also allows people to gain a better understanding of online peers' views on health issues and to learn from exposure to different perspectives (Mazuro & Rao, 2011). Prior studies also found that consuming supportive messages written by others is linked to positive health benefits (Kim et al., 2012).

### 4) Hypotheses

Chaffee and Schleuder (1986) early argued that it is important to take into account attention measures because exposure measures (e.g., hours) may not be comparable across various media formats. For example, hours of reading newspapers involve a certain level of both exposure and attention, while hours of watching TV can happen without much attention to the content. Therefore, it is particularly important to consider attention measures when comparing different types of media (Chaffee & Schleude, 1986). Based on the above discussion, we first propose two hypotheses to examine how attention to various health media is associated with people's engagement in patient-centered communication and online health messaging through different e-health platforms. Past studies acknowledged that interpersonal conversation can be prompted by mass media use (Shah et al., 2007; Southwell & Yzer, 2007), emphasizing the need for the evaluation of interpersonal communication to better understand the media effect. Interpersonal communication is often initiated by the public's interpreting and making sense of mediated content during and after media exposure and attention (Shah et al., 2007). Attention to mediated health content can provide a knowledge foundation that can serve as a basis for more informed discussions about the symptoms, diagnosis, and potential treatment

choices with one's interpersonal communication networks, including online and offline peers, friends and families, and healthcare providers. Information obtained from the mediated health content may help individuals prepare for relevant questions before the conversation, and seek further elaboration and clarification during the communicative interaction to make sense of them.

We also predict that attention to various health media will have a positive association with two interpersonal communication orientations. Even though entertainment-oriented media (, such as television and radio) may deliver less credible information than information-oriented media (, such as newspapers and magazines) (Dutta-Bergman, 2004), we expect that those who pay more attention to health information across different information sources will be more likely to come across health or medical information that may serve as an agenda for further discussion (Shim, Kelly, & Hornik, 2006). Based on this, we first investigate the relationship between health media attention (S) and two key interpersonal communication factors ($O_2$).

*H1. Attention to health media (such as newspaper/magazine, radio, television, and Internet) will be positively associated with patient-centered communication.*

*H2. Attention to health media (such as newspaper/magazine, radio, television, and Internet) will be positively associated with online health messaging through e-health platforms (such as support groups, email, social media, and blogs).*

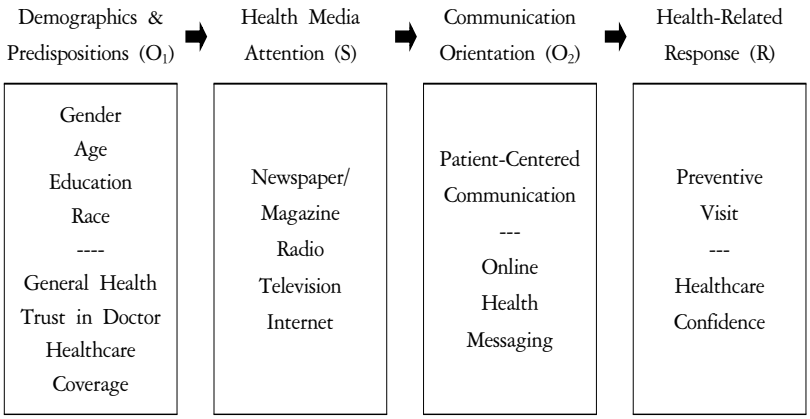
Further, it is expected that both patient-centered communication and online health messaging can contribute to psychological states of readiness to actively engage in general health-related outcomes, promoting more confidence in one's own healthcare and keeping up with the annual

preventive visit (Roberts et al., 1999; Street et al., 2009). Therefore, we test two hypotheses predicting the effect of interpersonal communication factors ($O_2$) on health outcomes (R).

*H3. Patient-centered communication will be positively associated with health confidence and preventive visit.*

*H4. Online health messaging through e-health platforms will be positively associated with health confidence and preventive visit.*

A conceptual framework is presented in Figure 1.




〈Figure 1〉 $O_1$-S-$O_2$-R Model of Health Media Attention, Communication Orientations, and Health Outcome

## 3. Methods

### 1) Data

We tested the proposed hypotheses using data collected from the Health Information National Trends Survey (HINTS 4, Cycle 1) conducted with a U.S. nationally representative sample (18 years or older) from 2011 through 2012. HINTS collects nationally representative cross-sectional survey data about American adults' use, access, and outcome of health information, health media and technology, and attitudes and behavioral outcome variables (HINTS, 2012). A two-stage sampling design was used to first identify a stratified sample of addresses, and then a sample of adults was chosen within the sampled household (HINTS, 2012). This resulted in a total of 3,959 participants completing the survey, with a response rate of 36.67%. The data analyzed in the current study was the last iteration of HINTS surveys which assessed attention to various health media. Given the purpose of this research, we conducted further analyses by limiting the sample to subjects who accessed the Internet or World Wide Web or sent and/or received emails to examine Internet-based interactive health messaging usage and its impact on health outcomes (N=2914).

Overall, white (66.1%) and females (59.7%) outnumbered the other category groups. In terms of education level, 4% had less than high school, 14.6% had completed high school, 31.6% had some college education, and 48.4% were college graduates and beyond. For the respondents' age levels, 18.5% were aged 18-34, 8.4% were 35-39, 9.6% were 40-44, and 62.1% were over 45 years old. 90.1% had healthcare coverage through either

public or private insurance. 14.6% assessed their own health status as excellent, 38.9% as very good, 33.9% as good, 9.9% as fair, and 2% as poor. 70% of the respondents said they trust their doctor a lot, followed by 24.7% some, 4% a little, and 0.8% not at all.

## 2) Measures

### (1) Health Media Attention

Newspaper/magazine use was measured using three items, which asked respondents how much attention they paid to information about health or medical topics from (a) online newspapers, (b) print newspapers, and (c) special health or medical magazine. The response category ranged from 1 (a lot) to 4 (not at all) and we reverse-coded these items so that a higher value reflects more attention. Average scores were calculated to create the variable (M = 2.27, SD = .73, Cronbach's alpha = .74). Television use was measured using two items: (a) local television news programs, and (b) national or cable television news programs. The question format and response category were the same. After reverse-code each item, we then averaged the scores to create the measure of television use (M = 2.27, SD = .80, r =.80). Radio use (M = 1.92, SD = .81) and Internet use (M = 2.97, SD = .82) were each measured with a single item using the same question format and response category. After reverse-coding, these two variables were retained as their own category.

### (2) Online Health Messaging

Online support group participation was measured by a dichotomous item (0 = no, 1 = yes [4.7%]) asking respondents whether, in the last 12

months, they participated in an online support group for people with a similar health or medical issue. Similarly, email communication with a doctor was measured by a dichotomous item (0 = no, 1 = yes [21.7%]) asking respondents whether, in the last 12 months, they used email or the Internet to communicate with a doctor or doctor's office. Health-related social media use was assessed by the same dichotomous format and asked whether respondents visited a "social networking" site, such as "Facebook" or "LinkedIn" to read and share about medical topics (14.7% yes). Finally, health-related blog use was measured by the same format, which asked whether respondents wrote in an online diary or "blog" about any type of health topic (3.4% yes). All items were reverse-coded and were separately included in the regression models due to a low internal consistency.

**(3) Patient-Centered Communication**

Following previous research (Finney Rutten et al., 2015; Hong & Oh, 2020), patient-centered communication was measured using seven items, which asked how often healthcare professionals respondents interacted with during the past 12 months do each of the following: (a) "give you the chance to ask all the health-related questions you had", (b) "give the attention you needed to your feelings and emotions", (c) "involve you in decisions about your health care as much as you wanted", (d) "make sure you understood the things you needed to do to take care of your health", (e) "explain things in a way you could understand", (f) "spend enough time with you", and (g) "help you deal with feelings of uncertainty about your health or health care." The response category ranged from 1 (always) to 4 (never) and we reverse-coded these items so that a higher value reflects more patient-centered communication. The items were averaged to

create the measure of patient-centered communication (M = 3.29, SD = .70, Cronbach's alpha = .93).

**(4) Health Outcomes**

Two health outcomes were employed in the current research. Preventive visit was assessed with the item, "About how long has it been since you last visited a doctor for a routine checkup?" Possible responses included: 1 = within the past year (anytime less than 12), 2 = within the past 2 years (1 year but less than 2), 3 = within the past 5 years (2 years but less than 5), 4 = 5 or more years ago, and 5 = Never. This item was reverse coded so that a higher score reflects more frequent visits. A vast majority (69.8%) had visited their doctor's office for a routine checkup within the past year. Healthcare confidence was measured with the item, "Overall, how confident are you about your ability to take good care of your health?". Possible responses ranged from 1 (completely confident) to 5 (not confident) (M = 2.93, SD = .81). This item was also reverse scored.

## 3) Analytic Framework

This study employed binary logistic regression and ordinary least squares (OLS) regression to test the proposed hypotheses. Binary logistic regressions were used to examine four types of online health messaging variables (online support group, social media, email doctor, and blog) as dependent variables. OLS multiple regression procedures were conducted to investigate patient-centered communication, preventive visit, and healthcare confidence as outcome variables. Gender, age, education, and race, as well as general

health status, trust in doctors, and healthcare coverage, were controlled in the analyses to minimize confounding effects. Replicate weights to adjust results to population estimates were not employed since we were mainly interested in testing associations between variables by applying a previously established model (DuMouchel & Duncan, 1983; Kish & Frankel, 1974; Ruppel, 2016; Shim et al., 2006).

## 4. Results

The first hypothesis predicted that attention to health media will be positively associated with patient-centered communication. As shown in Table 1, the results from OLS regression analysis suggest that attention to health or medical information when people use newspaper/magazine, radio, television, and Internet (S) failed to have a statistically significant association with patient-centered communication ($O_2$), with demographics and predispositions ($O_1$) accounting for the large variance of it. Therefore, H1 was not supported.

Our second hypothesis posited that attention to health media (S) will be positively associated with online health messaging through e-health platforms such as support groups, email, social media, and blogs ($O_2$). As shown in Table 1, the results from binary logistic regression analyses suggest that the models predicting interactive health messaging ($O_2$) performed well, with attention to newspaper/magazine and Internet (S) positively predicting emailing doctors (OR = 1.24, $p < .05$ for newspaper/magazine, OR = 1.28, $p < .001$ for Internet). A similar trend was found that attention to

〈Table 1〉 $O_1$-S-$O_2$-R Model of Media Attention, Online Health Messaging, Patient-Centered Communication, and Health-Related Outcomes

| | Communication Orientations ($O_2$) | | | | | Response (R) | |
|---|---|---|---|---|---|---|---|
| | Online Health Messaging (Binary Logistic Regression) | | | | Patient-Centered Communi-cation | Preventive Visit | Healthcare Confidence |
| | Support Group | Email Doctor | Social Media | Blog | | | |
| **Demographics** | | | | | | | |
| Gender (female) | 2.26*** | 1.07 | 1.61*** | 2.49** | .05* | .02 | -.01 |
| Age | .78** | .98 | .69*** | .67*** | .12*** | .15*** | -.02 |
| Education | 1.25 | 1.42*** | .79** | .98 | -.07* | .04 | -.04 |
| Race (white) | 1.04 | 1.18 | .89 | 1.16 | -.01 | -.09*** | -.03 |
| **Predispositions ($O_1$)** | | | | | | | |
| General Health Status | .70** | .98 | .89 | .79 | .15*** | .04 | .48*** |
| Trust in Doctor | .66** | 1.11 | .94 | .89 | .29*** | .02 | -.02 |
| Healthcare Coverage (yes) | 1.19 | 2.07** | 1.19 | 1.16 | -.01 | .13*** | .08*** |
| **Health Media Attention (S)** | | | | | | | |
| Newspaper/Magazine | 1.47* | 1.24* | 1.23* | 1.10 | -.01 | .05* | -.01 |
| Radio | .72* | 1.07 | 1.05 | 1.12 | .02 | -.05 | -.01 |
| Television | .95 | .80* | .94 | .86 | -.02 | -.02 | .01 |
| Internet | 1.54** | 1.28*** | 1.26** | 1.25 | .03 | .03 | -.01 |
| **Outcome Orientation ($O_2$)** | | | | | | | |
| Online Health Messaging | | | | | | | |
| Online Support Group | --- | --- | --- | --- | --- | .01 | -.01 |
| Email Doctor | --- | --- | --- | --- | --- | -.01 | -.01 |
| Social Media | --- | --- | --- | --- | --- | .06* | -.01 |
| Blog | --- | --- | --- | --- | --- | -.01 | -.01 |
| Patient-Centered Communication | --- | --- | --- | --- | --- | .17*** | .23*** |
| Total $R^2$ (percentage) or $X^2$ | $X^2$=72.80 | $X^2$=81.71 | $X^2$=117.89 | $X^2$=37.46 | *$R^2$=12.9* | $R^2$=8.5 | $R^2$=10.7 |

Note: Cell entries are either odds ratios and chi-squares (in binary logistic regression) or standardized betas and $R^2$ (in OLS multiple regression). N= 2,341 (support group); 2,341 (email doctor); 2,343 (social media); 2,340 (blog); 2011 (patient-centered communication); 1,923 (provider visit); 1,923 (healthcare competence). *$p<.05$*, *$p<.01$**, *$p<.001$****.

newspaper/magazine and Internet (S) was positively associated with participation in online support groups (OR = 1.47, p < .05 for newspaper/magazine, OR = 1.54, p < .01 for Internet) and social media for sharing and engaging (OR = 1.23, p < .05 for newspaper/magazine, OR = 1.26, p < .05 for Internet). However, attention to radio (S) was negatively associated with support group participation (OR = 0.72, p < .05) and attention to television (S) negatively predicted emailing doctor (OR = 0.80, p < .05). Thus, H2 was partially supported.

The third and fourth hypotheses posited that patient-centered communication and online health messaging will be positively associated with health confidence and preventive visit, respectively. OLS regression analyses were conducted to reveal the relationship between two interpersonal communication orientations ($O_2$) and health-related outcomes (R) while controlling for demographics, predispositions ($O_1$), and health media attention (S). The results suggest that patient-centered communication ($O_2$) was positively and significantly associated with regular preventive visits ($\beta$ = .17, p < .001) and perceived healthcare confidence ($\beta$ = .23, p < .001). Among online health messaging factors, only social media use ($O_2$) positively predicted regular preventive visits ($\beta$ = .06, p < .05). Therefore, H3 was supported, while H4 was partially supported.

## 5. Discussion

By adopting $O_1$-S-$O_2$-R framework, this study analyzed HINTS data to examine (a) how attention to various traditional and online health media is

associated with people's engagement in patient-centered communication and online health messaging through different e-health platforms, and (b) whether patient-centered communication and online health messaging contribute to two health-related outcomes of health confidence and annual preventive visit. This study found that while attention to health media did not significantly predict patient-centered communication, attention to newspaper/magazine and Internet positively predict online health messaging through support group participation, emailing doctors, and social media. However, attention to radio was negatively related to support group participation, and attention to television was also negatively associated with emailing doctors. We also found that patient-centered communication was positively and significantly associated with regular preventive visits and perceived healthcare confidence, while only social media use positively predicted regular preventive visits.

Our research supports previous studies that highlight the importance of patient-centered communication in medical encounters to maintain confidence in healthcare and routine checkups (Finney Rutten et al., 2015; Hong & Oh, 2020; Hou & Shim, 2010). This remains true regardless of demographic factors, predisposition factors such as one's general health status, or attention to various health media. However, our study has revealed that utilizing social media for reading and sharing health-related topics can significantly predict the chances of individuals staying up to date with their regular checkups, compared to other messaging platforms. One might interpret that this result signifies a promising role of social media in a healthcare context because the use of social media for health information consumption can encourage individuals to seek more information about their health by regularly visiting their doctor's office. We are cautious about this

interpretation given that social media has no tangible effect on one's confidence in healthcare (see Table 1). It can also mean that health information encountered on social media may not always be reliable or correct, thus requiring further discussion with their healthcare provider to clear up any confusion or misunderstandings. Further research is necessary to determine which interpretation is more logical in explaining the impact of social media on healthcare by examining users' needs, motivations, and barriers when engaging in social media-based health messaging.

Our study found that people who pay attention to health or medical information on the internet and in newspapers/magazines are more likely to engage with online health messaging through different platforms. Listening to the radio and watching TV each predicted health messaging through one specific platform. The findings are consistent with the idea that mass media and interpersonal communication channels complement each other in a way that health information seekers utilize multiple resources to obtain and share information (Rains & Ruppel, 2016). In this regard, online health messaging, as a form of interpersonal communication, can be prompted by attention to health media (Shah et al., 2007), but the patterns were varied depending on which media they primarily use for health or medical information. Newspapers and magazines have been considered more trustworthy sources for health information (Dutta-Bergman, 2004). For those who pay more attention to these media sources, sharing credible information or asking relevant questions on various health messaging platforms can potentially empower both senders and receivers, enhancing their control over health concerns and problems (Roberts et al., 1999). However, it is worth noting that attention to the Internet predicts health messaging in a similar way to newspapers and magazines. It is unclear

whether people are motivated to use online health messaging platforms because they encounter credible or unreliable health information during their Internet searches, or if it is simply because both platforms operate in a similar web-based online environment, thus allowing for easy sharing of information. This inquiry could lead to an interesting research agenda in the future.

Notably, we found that none of the health media attention significantly predict patient-centered communication. The variance is largely explained by demographics and predispositions such as one's general health status and trust in doctors, which is in line with the most recent studies on predictors of patient-centered communication (Trivedi, Moser, Breslau, & Chou, 2021). Attention to health media might help people obtain extensive information resources for their own healthcare. Epstein and Street (2007) define that the media environment serves as one of the contextual elements that can externally shape patient-clinician communication. On the other hand, patient-centered communication also relies on the provider's response to the patient's emotions and concerns, psychological needs, and uncertainty (Cegala et al., 1996; Wanzer et al., 2004). Thus, more research is needed to articulate the potential role of the media environment in promoting patient-centered communication and how it affects the provider's perspective on patient-centered care.

The mechanism through which health media attention directly or indirectly influences health-related decision-making uncovers important differences among health information sources and between forms of interpersonal health communication the public may regularly engage in. As noted, the field of health communication still lacks empirical research adopting and testing the $O_1$-S-$O_2$-R model to better understand the

complex interrelationship of health media consumption with structural and dispositional factors, online and offline interpersonal conversation, and resultant attitudinal and behavioral response. This study further expands the model's applicability to health-related media effect research using a nationally representative cross-sectional survey and provides general support for the integrative theoretical framework in our understanding of an evolving health communication media landscape and its impact on individuals.

This study has several limitations. First, since we analyzed the secondary data included in the HINTS survey, some of the variables were measured with a single item lacking sufficient evidence of their reliability and validity even though previous studies have frequently adopted them for publications. To ensure the psychometric properties of those constructs, future studies need to adopt and test multi-items for those variables in order to assess and consider any measurement error for the data analysis process. Second, the hypotheses tested in the current study are based on a cross-sectional survey analysis. Therefore, the associations tested cannot claim causal influence and the reverse interpretation of the data is also plausible. For example, we proposed that patient-centered communication will be positively associated with healthcare confidence, but it is also possible that those with more confidence in their healthcare are more likely to engage in patient-centered communication. Future research needs to employ longitudinal data collection to clarify the directionality of influence among variables tested in the current study. Third, the data analyzed in this study were collected from 2011 through 2012. While this was the last iteration of HINTS surveys where attention to various health media was assessed, the media environment has since changed

dramatically, including the rising usage of YouTube and other emerging social media for health information and support. It is worthwhile to collect additional data and examine the interplay of health media attention and online health messaging predicting subsequent health benefits in the current media environment.

The findings from this research provide several important implications for health communication practice. First, doctors and healthcare professionals need to pay careful attention to patients' thoughts and feelings when communicating about treatment or options for care and promote an open communication environment where patients could take an active role in their healthcare decision-making process. To do this, training and education in collaborative communication skills addressing patients' needs become increasingly important for providers, which will eventually lead to routine checkups and preventive health screenings. Further, given that social media has increasingly become a popular source for obtaining health information and social support, it is necessary for patients to discuss with their doctors the accuracy and credibility of health information exposed while interacting with others on social media. Our finding that social media use did not predict one's healthcare confidence but rather keeping up routine checkups might tell us that information circulated on social media incurs more questions or confusion that has to be verified through conversation with healthcare providers.

Overall, findings from this study shed some important light on (a) the relationship between health media consumption and interpersonal communication, and (b) how health media consumption and interpersonal communication orientations work independently to influence health-related outcomes among the general public. Future research should examine how

health media consumption and interpersonal communication work *jointly* to produce health benefits to unravel whether more complex associations exist.

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